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EXAMINER	
PATEL, DHAVAL V	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/544,108	MYSORE ET AL.
	Examiner	Art Unit
	DHAVAL PATEL	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *37-62* is/are allowed.

6)☒ Claim(s) *1-8,10-22 and 24-36* is/are rejected.

7)☒ Claim(s) *9 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection because of newly added limitations into currently amended claims. Respond to the amendment is described below.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1, 2, 26 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Chan et al. (US 7,359,313) (hereafter Chan).**

Regarding claims 1, 26 and 27, Chan discloses a method and system for estimating data transmitted by a plurality of transmit elements (see abstract, MIMO communication system) across a communications channel, comprising:

a) a plurality of receive interfaces (Fig. 3, 301(1) thru 301 (Nr)), each receive interface (Fig. 3, Fig. 3, 301(1) thru 301 (Nr)), operative to receive a signal (Fig. 3, MIMO communications) via the communications channel (col. 3 lines 66-67) and output

a respective sequence of received data elements (Fig. 3, col. 3 lines 58-66, parallel sub channels);

b) a space matched filter (Fig. 3, 303 col. 4 lines 13 , match filter) connected to said plurality of receive interfaces (Fig. 3, receiver interfaces, Fig. 3, Fig. 3, 301(1) thru 301 (Nr)) and operative to:

i) assemble the received data elements into sets of received data elements (Fig. 3, col. 4 lines 1-5, FFT modules 302(1)- 302(N)), each said set of received data elements (FFT modules 302(1)- 302(N)),) including at least one received data element from each sequence of received data elements (Fig. 3, FFT process received data in frequency domain which is transmitted from transmit antennas); and

ii) jointly process (Fig. 3, col.4 line 4, matched filtering) each set of received data elements (Fig. 3, received data elements through received antennas) with each of a plurality of channel data elements (col. 4 lines 10-15, match filtering after the DFT process which is in frequency domain processing and matched filtering with channel impulse response, col. 4 lines 32-35 and lines 47-51) produce a corresponding plurality of filtered data elements (Fig. 3, the data after 303 is filtered data elements), each filtered data element (Fig. 3, output of the matched filter, 303) being associated with one of the transmit elements (Fig. 3, the output at the K th sub carrier and at the Jthe time slot from the jth receive antenna matched filter after the discrete fourier transform (DFT)) each channel data element (Fig. 3) being representative of a portion of the communications channel between an associated one of the transmit elements and said plurality of receive interfaces (col. 4 lines 25-31 disclose equation 1 and H defines as

channel impulse response which is defined as equivalent channel frequency response of the link between the ith transmit antenna and jth receiver antenna at the Kth sub carrier . col. 4 lines 47-51 discloses the channel impulse response of the each antenna links are defined frequency selective channel, col. 4 lines 57-67, channel frequency response using absolute magnitude (amplitude) and rayleigh distribution);

c) a detector (Fig. 3, col. 5 lines 50-55, mimo with soft value estimates) connected to said space matched filter (Fig. 3, 303 is considered space match filter) and operative to process each filtered data element to produce a corresponding decision data set therefor (Fig. 3, col. 4 lines 51-67).

Regarding claim 2, Chan further discloses the system wherein each receiver interface comprises a respective receive antenna (Fig. 3, 301(1) - 301(N)).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: ***(See MPEP Ch. 2141)***

a. Determining the scope and contents of the prior art;
b. Ascertaining the differences between the prior art and the claims in issue;
c. Resolving the level of ordinary skill in the pertinent art; and
d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

5. **Claims 3,4, 10, 21, 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Schilling et al. (US 6,757,322)(hereafter Schilling).**

Regarding claim 3, Chan does not explicitly disclose the system defined in claim wherein said space matched filter being operative to jointly process each set of received data elements with each of a plurality of channel data elements to produce a corresponding plurality of filtered data elements includes said space matched filter being operative to perform a linear combination of the received data elements in the set of received data elements to produce each of the filtered data elements.

in the same field of endeavor, , Schilling teaches the system, wherein said space matched filter (Fig. 3, matched filters) being operative to jointly process each set of received data elements (Fig. 3, matched filters process the received data from each antennas RA1...RA4) with each of a plurality of channel data elements (col. 8 lines 21-67 discloses as to how the sequence of data and matched filters process, matched filters matched the impulse response with the received chip sequence) to produce a corresponding plurality of filtered data elements includes said space matched filter being operative to perform a linear combination of the received data elements in the set of received data elements to produce each of the filtered data elements (Fig. 3, rake and space combiners, 161…164).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Schillings, into the system of Chan, as a whole, so as to perform matched filtering so as to linearly combine the receive data elements to produce each of the filtered data elements, the motivation is to improve performance of spread spectrum communication system (col. 1 lines 55-56).

Regarding claim 4, Schilling further teaches the system, wherein the number of filtered data elements (Fig. 3, filtered data elements, matched filtering and space and rake combining (Fig. 3, rake and space combining, 161 thru 164) the data produces four signals which are same as the number of transmit antennas (Fig. 1, TA1..TA4) produced from each set of received data elements equals the number of transmits elements.

Regarding claim 10, Schilling further teaches the system, further comprising a multiplexer (Fig. 3, multiplexer, 132) for combining multiple decision data sets for filtered data elements (Fig. 3, matched filtered data combining, 161 thru 164) associated with different ones of the transmit elements (Fig. 1, transmit elements, TA1..TA4) into a single sequence of decision data sets (Fig. 3, FEC decoder, 62).

Regarding claim 21, Schilling further teaches the system defined in claim 1, wherein said space matched filter is further operative to obtain the channel data

elements from an external source (Fig. 3, each match filtered received sequence is matched with impulse response).

Regarding claim 29, the combined teachings of both Chan and Schillling discloses all the subject matter explained above. Schilling furthermore teaches a system for data communication over a multi-input, multi-output (MIMO) channel (claim 25, MIMO), comprising:

a) a transmitter unit (Fig. 1), comprising: i) a de-multiplexer (Fig, 1, 22) for separating an information stream into a plurality of information sub-streams(Fig. 1, sub streams g1(t), g2(t) etc…); ii) a plurality of transmit interfaces (Fig. 1, TA1 thru TA4) for simultaneously transmitting respective ones of the information sub-streams (Fig. 1, g1(t).. g4(t)) over the MIMO channel (claim 25, MIMO communication system);

Regarding claim 30, Schilling further discloses the system defined in claim 30, wherein the number of receive interfaces is at leas as great as the number of transmit interfaces (Fig. 1 and Fig. 3)

Regarding claim 31, Schilling further discloses the system defined in claim 31, wherein the number of receive interfaces is less than the number of transmit interfaces (Figs. 1 and 3, one of ordinary skilled in the art would easily modify the current system with other MIMO system in which receiver antennas are less than the transmit antennas

as different diversity scheme)

Regarding claim 32, Schilling further discloses the system defined in claim 31, wherein each transmit interface includes a transmit antenna (Fig. 1, TA1 thru TA4).

Regarding claim 33, Schilling further discloses the system defined in claim 31, wherein the MIMO channel is a wireless channel (claim 25, MIMO and space diversity).

6. **Claims 6 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Onggosanusi et al. (US 7,133,459) (hereafter Onggosanusi).**

Regarding claim 6, Chan does not explicitly disclose the system, wherein the decision data set for a particular filtered data element includes a soft decision data set for the particular filtered data element.

In the same field of endeavor, Onggosanusi teaches maximum likelihood detector as a iterative detector to output a soft output for each possible symbol and a MAP decode would use such detector outputs (col. 5 lines 64-67 and col. 6 lines 6-13).

Therefore, for the same motivation as established for claim 1 above, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Onggosanusi, into the system of Chan, as a whole, so as to use such detection technique to provide soft outputs, as taught by Onggosanusi, into the system of Schilling in order to improve data rate and throughput.

Regarding claim 22, Chan is silent about the system defined in claim 1, wherein said space matched filter is further operative to compute the channel data elements based on measurements of the communications channel.

In the same field of endeavor, Onggosanusi teaches matched filtering coefficient is calculated as channel estimation for the channel paths from transmitter antenna to receiver antenna (col. 4 lines 61-65) .

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Schilling and Onggosanusi, as a whole, so as to provide motivation as explained in claim 1.

7. **Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Hochwald et al. (US 7,236,536) (hereafter Hochwald).**

Regarding claim 5, Chan do not explicitly discloses to generate the filtered data elements to generate hard information data.

In the same field of endeavor, Hochwald teaches generating the received data based on hard decision of the received detected data elements from plurality of antennas (Fig. 1b).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Hochwald, into the system of Chan, as

a whole so as to generate hard decision filtered data, the motivation is to achieve desired performance (col. 5 lines 61-62).

8. **Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan and Onggosanusi, as applied to claim 6 above and further in view of Hochwald et al. (US 7,236,536) (hereafter Hochwald).**

Regarding claim 7, Chan and Onggosansusi do not explicitly discloses wherein the soft decision data set for the particular filtered data element includes a set of values, each value in the set of values being indicative of a likelihood or reliability associated with transmission of a corresponding symbol by the transmit element associated with the particular filtered data element.

In the same field of endeavor, Hochwald teaches detection and decoding technique in which invention employs an iterative process to estimate the likelihood that a bit belongs to a particular symbol. a MIMO detector incorporates soft reliability information provided by a channel decoder and channel decoder in its turn incorporates the soft information provided by the MIMO detector and the information between the detector and the decoder is exchanged in an iterative fashion until desired performance is achieved (col. 5 lines 53-62).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Hochwald, into the system Chan and Onggosanusi, as a whole, so as to provide reliability information for each of the filtered

parallel data elements using soft decision, the motivation is to achieve desired performance (col. 5 lines 61-62).

9. **Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan, Onggosanusi and Hochwald , as applied to claim 7 above, and further in view of Gorokhov et al. (US 7,397,826) (hereafter Gorokhov).**

Regarding claim 8, the combined teachings of Chan, Onggosanusi and Hochwald do not explicitly disclose the system, wherein the likelihood or reliability associated with transmission of the corresponding symbol by the transmit element associated with the particular filtered data element includes an a posteriori probability.

In the same field of endeavor, Gorokhov teaches that in soft decision decoding, a FEC decoder generates (soft) real valued metrics that represents the reliability information of the input bits. Usually, each soft metrics is log likelihood ratio, the logarithmic of the ratio of a posteriori probabilities of an input bit being 0 verses a posteriori probabilities of this bit being 1 (col. 7 lines 57-65).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Gorokhov, into the system of combined teachings of Chan, Onggosanusi and Hochwald, as a whole, so as to generate the soft decoding using posteriori probability information to retrieve the original data, the motivation is to ensure a better performance (col. 8 lines 2-3).

10. **Claims 11-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan and Schilling, as applied to claim 10 above, and further in view of Ten Brink et al. (EP 0998045) (Hereafter Brink).**

Regarding claim 11, the combined teachings of Chan and Schilling do not explicitly discloses the system defined in claim 10, further comprising a de-mapper connected to said multiplexer, said de-mapper being operative to produce a soft representation for each decision data set in the sequence of decision data sets.

In the same field of endeavor, Brink teaches de-mapper is a soft de-mapping device that has been modified in order to receive a priori information obtained from the decoder. The iterative decoding and de-mapping can be iterative decoding process whereby the inner decoder is replaced by the soft de-mapping device (page 3, [0016]).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to incorporate such de-mapping device, as taught by the Brink, in to the combined system of Chan and Schilling, as a whole, so as to de-mapping the received decision data based on the soft information generated by the soft decoder or FEC decoder, the motivation is to provide improved bit error rate (page 3, [0016]).

Regarding claim 12, the combined teachings of both Chan and Schilling do not explicitly discloses the system defined in claim 11, wherein said de-mapper being operative to produce a soft representation for each decision data set in the sequence of decision data sets includes said de-mapper being operative to assign, to a particular

data set, a numerical value corresponding to a sum of symbol values weighted by the contents of the particular data set.

In the same field of endeavor, Brink teaches de-mapper is a soft de-mapping device that has been modified in order to receive a priori information obtained from the decoder. The iterative decoding and de-mapping can be iterative decoding process whereby the inner decoder is replaced by the soft de-mapping device (page 3, [0016]). Furthermore, it teaches mapping store for storing a plurality of different mappings and means for determining iterations and selecting the optimum mapping information (col. 5 lines 29-51).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to incorporate such de-mapping device, as taught by the Brink, in to the combined system of Chan and Schilling, as a whole, so as to de-mapping the received decision data based on the soft information generated by the soft decoder or FEC decoder, the motivation is to provide improved bit error rate (page 3, [0016]).

Regarding claim 13, Brink furthermore discloses the system defined in claim 12, wherein the symbol values correspond to numerical representations of respective points in a constellation (Figs 4-7, constellation mappings)

Regarding claim 14, , the combined teachings of both Chan and Schilling do not explicitly discloses the system defined in claim 11, further comprising a decoder

connected to said de-mapper, said decoder being operative to transform the soft representations provided by said de-mapper into a stream information symbols.

In the same field of endeavor, as shown in Fig. 4, decoder is connected to the demapping device to demap the data based on soft information from the decoder. Furthermore, decoder as show in Fig. 4 being operative to transform the soft information provided by the de-mapping device into stream of symbols an dfurther provided to hard decision data to provide the received data (Fig. 4).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to incorporate such de-mapping device, as taught by the Brink, in to the combined system of Chan and Schilling, as a whole, so as to generate the soft valued data based on the de-mapping information, the motivation is to provide improved bit error rate (page 3, [0016]).

Regarding claim 15, Schilling further discloses the system defined in claim 14, wherein said decoder is an error correction decoder (Fig. 3, FEC decoder, 62).

Regarding claim 16, Brink further discloses the system defined in claim 14, wherein said decoder is selected from the group consisting of a turbo decoder, a Reed-Solomon decoder, a convolution decoder and a block decoder (page 2, [0002]).

Regarding claim 17, the combined teachings of both Chan and Schilling do not explicitly disclose the system defined in claim 14, said decoder being further operative

to generate reliability values on the information symbols, wherein said de-mapper being operative to produce a soft representation for each decision data set in the sequence of decision data sets includes said de-mapper being operative to produce said soft representation at least partly on the basis of the reliability values from said decoder.

In the same field of endeavor, Brink teaches de-mapper is a soft de-mapping device that has been modified in order to receive a priori information obtained from the decoder. The iterative decoding and de-mapping can be iterative decoding process whereby the inner decoder is replaced by the soft de-mapping device (page 3, [0016]). Furthermore, it teaches mapping store for storing a plurality of different mappings and means for determining iterations and selecting the optimum mapping information (col. 5 lines 29-51).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to incorporate such de-mapping device, as taught by the Brink, in to the combined system of Chan and Schilling, as a whole, so as to de-mapping the received decision data based on the soft information generated by the soft decoder or FEC decoder, the motivation is to provide improved bit error rate (page 3, [0016]).

Regarding claim 18, Schilling discloses multiplexer connected to FEC decoder (Fig. 3), but do not explicitly discloses decoder being operative to produce a set of information symbols for each decision data set in the sequence of decision data sets.

In the same field of endeavor, as shown in Fig. 4, decoder is connected to the de-mapping device to de-map the data based on soft information from the decoder.

Furthermore, decoder as show in Fig. 4 being operative to transform the soft information provided by the de-mapping device into stream of symbols and further provided to hard decision data to provide the received data (Fig. 4).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to produce a set of information symbols for each decision data set in the sequence of decision data sets, as taught by Brink, into the system of both Chan and Schilling, as a whole, the motivation is to provide improved bit error rate (page 3, [0016]).

Regarding claim 19, the combined teachings of both Chan and schilling do not explicitly discloses the system defined in claim 18, wherein said decoder being operative to produce a set of information symbols for each decision data set in the sequence of decision data sets includes said decoder being operative to select one of a predetermined set of information symbols on the basis of the contents of the particular data set.

In the same field of endeavor, Brink teaches SISO decoder in which a soft values represents the reliability on the bit decision of the respective bit symbols. a soft in decoder accepts the reliability information for the incoming bit symbol. A soft out decoder provides soft reliability values on the outgoing bit symbols. The demapping device is selecting the optimum mapping data based on channel conditions (col. 8, [0034] and col. 11 lines 32-36).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to produce a set of information symbols for each decision data set in the sequence of decision data sets, as taught by Brink, into the system of both Chan and Schilling, as a whole, the motivation is to provide improved bit error rate (page 3, [0016]).

Regarding claim 20, Brink further discloses the system defined in claim 19, wherein each set of information symbols in the predetermined set of information symbols corresponds to a respective point in a constellation (Figs. 4-7, constellation mapping).

11. **Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan, Schilling, Ten Brink et al and further in view of Onggosanusi**.

Regading claims 24 and 25, the combined teachings of Chan, Schilling and Brink do not explicitly disclose 24. The system of claim 17, further comprising an interference reducing filter disposed between said spaces matched filter and said detector and the system of claim 24, wherein the interference reducing filter comprises a minimum mean square error (MMSE) filter.

in the same field of endeavor, Onggosanusi teaches the system of claim 17, further comprising an interference reducing filter (Onggosanusi, Fig. 2e, interference resistance detection) disposed between said space matched filter (Schilling, Fig. 3,

space time combining) and said detector (Schilling, Fig. 3, FEC decode) and Ongosanusi further teaches the system of claim 24, wherein the interference reducing filter comprises a minimum mean square error (MMSE) filter (col. 13 lines 6-10, MMSE).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine teachings of Onggosanusi, into the system of Chan, Schilling and Brink as a whole, so as to incorporate interference reduction filter between the space match filter and detector, the motivation is to improve data rate and throughput.

12. **Claims 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Langberg et al. (US 5, 852, 630) (hereafter Langberg).**

Claim 28 discloses all the subject matter as recited in claim 1 above except for computer-readable store medium containing a program element for execution by a computing device.

In the same field of endeavor, Langberg teaches that the method and apparatus for a transceiver warm start activation procedure with precoding that can be implemented in software stored in a computer readable medium. The computer readable medium is an electronic, magnetic, optical or other physical device or means that can be contain or store a computer program for use by or in connection with computer related system or method (col. 3 lines 51-65). One skilled in the art would have easily recognized that the method of Chan would have been implemented in

software. The implemented software would perform same function of the hardware for less expense, adaptability and flexibility. Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention was made to use the software as taught by Langberg in the Chan in order to reduce the cost and improve the adaptability and flexibility of communication system.

13. **Claims 34-36 rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Forsythe et al. (US 6,745,050) (hereafter Forsythe).**

Regarding claim 34, Chan discloses all the subject matter except a system for estimating for data transmitted from each of a plurality of users and the method and jointly process the space matched filtering for each user.

In the same field of endeavor, Forsythe teaches multi channel multi-user detection technique in which number o wireless signals are received at several antennas (32a-32d). Several instantiations of detections 56a-56c, each corresponding to the particular user, are invoked, after correlating process, the signals are selected from the best taps are processed via space time adaptive method. The signal are then matched filtered (62) and signal decision occurs (col. 6 lines 23-33).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Forsythe, into the system of Chan, as a whole, so as to perform the method as disclosed by Chan, into the multi user

detection process in which each user is associated with the particular antenna, the motivation is to perform efficient multi channel multi-user detection (abstract).

Regarding claim 35, Fortsythe further discloses the system, wherein the number of transmit elements for each user is greater than one (Fig. 9).

Regarding claim 36, Fortsythe further discloses the system, residing in a base station (col. 4 lines 29-30, furthermore, one of ordinary skilled in the art would easily recognized that this system can be employed either in the base station or at the user terminal since both require the signal detection for decisions).

Allowable Subject Matter

14. Claims 37-62 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The closest prior art fails to disclose the system defined in claim 8, wherein the a posteriori probability is computed at least partly on the basis of: i) the particular data element; ii) the corresponding symbol; and iii) a plurality of correlation data elements, each correlation data element being representative of a relationship between the channel data element associated with the transmit element associated with the particular filtered data element and a corresponding one of the channel data elements associated with a different one of the transmit elements and The system of claim 18, said decoder being further operative to compute statistical properties of the transmitted data, wherein said detector being operative to process each filtered data element to

produce a corresponding decision data set therefor includes said detector being operative to (i) compute statistical properties of the communications channel on the basis of the statistical properties of the transmitted symbols received from said decoder and (ii) process each filtered data element on the basis of the statistical properties of the communications channel. The distinct features of claims 37 and 44 renders the claims allowable.

Claims 9 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DHAVAL PATEL whose telephone number is (571)270-1818. The examiner can normally be reached on M-F 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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